SOILS

Soils in Lancaster County tend to have high clay content and are productive for agriculture. In 1984, soils were rated and categorized by the US Soil Conservation Service, based on their productivity. A total of 159,950 acres of Lancaster County soil is rated as prime farmland, constituting about 30% of soils outside the City of Lincoln. The fertile soil is chiefly why nearly 80% of the land area of the County is used for farming purposes, or about 450,000 acres (See Map 2, Root Zone Available Water-Holding Capacity).

Data Sources

Information regarding soil quality was compiled from the Lancaster County Soil Survey Geographic Database (SSURGO), 1980 Lancaster County Soil Survey, and 1990 Historic and Ecological Resources Survey from the Lincoln-Lancaster County Ecological Advisory Committee. 1990 US Census and 1997 Agricultural Census for Lancaster County data were also used.

County Level Patterns and Perspectives

Soils in Lancaster County are moderately well to well drained. Permeability and infiltration rates play an important role in how water drains or runs-off. For the most part, soils north of Lincoln permit faster infiltration rates while soils south of Lincoln have slower infiltration rates and thus high runoff potential. High runoff increases the magnitude of flood events downstream and can affect erosion. The top of the Salt Watershed is located in the South portion of the County, where higher runoff rates occur. Runoff rates increase near the top of a watershed.

Hydric and saline soils are more prevalent in the north portion of the county and give rise to numerous freshwater and saline wetlands. Hydric (flood-prone) soils are defined as soils that hold water and drain poorly while saline soils are defined as soils that have higher than average salt contents. The high salinity and low quantity in the north interferes with the availability of drinking water. This has been a problem for some residents, which necessitated the treatment of their drinking water. In general, there is a limited amount of drinking water in the north portion of the county, saline soils and salt-intrusion. As salinity decreases, drinking water improves in the southern portion of the County (See Map 3, Hydrologic Soil Groups of Lancaster County).

Photo: NEBRASKAland Magazine / Nebraska Game and Parks Commission

Furthermore, soils in Lancaster County have high frost action, which means they are susceptible to frost heaving. Frost heaving is when ice crystals draw water from surrounding soils and cause the displacement of soil. This can cause damage to building foundations, retaining walls, driveways, sidewalks, service lines and similar structures. Understanding where frost action is high will help deal with its potential consequences.

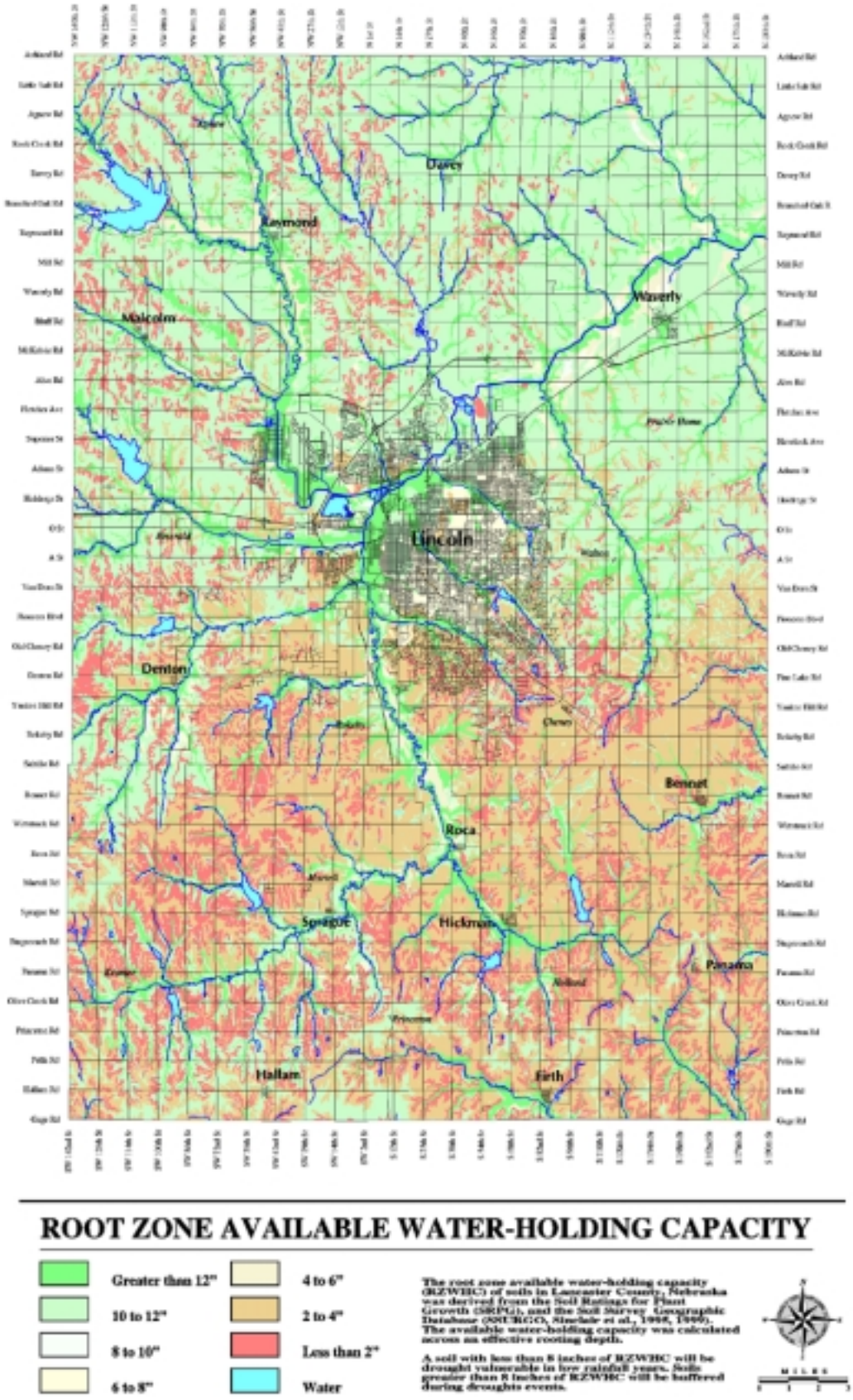

Image by: Lincoln-Lancaster County Planning Department

Map 2

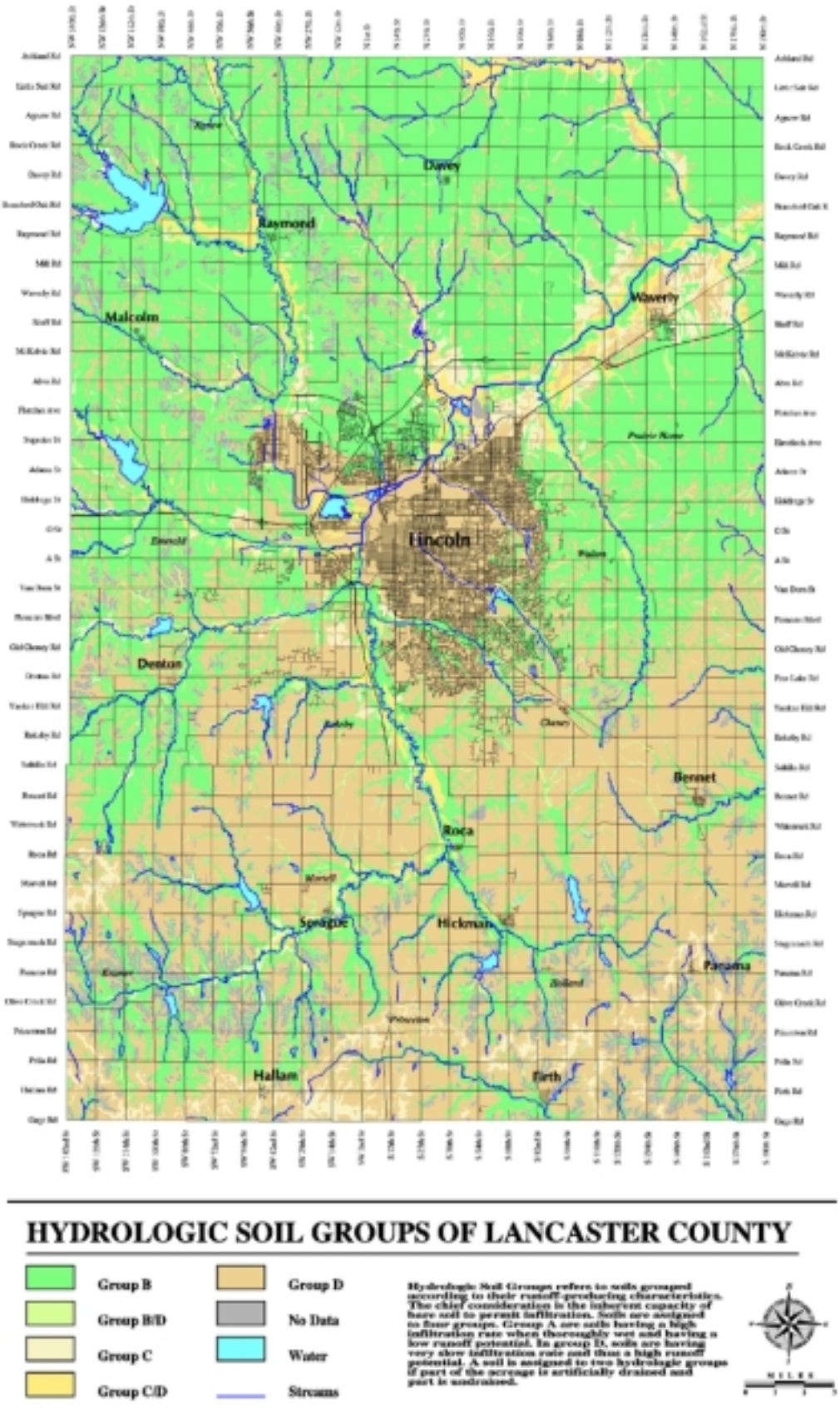

Image by: Lincoln-Lancaster County Planning Department

Map 3

In addition to high frost action, soils throughout the county have high shrink-swell potential. Shrink-swell is when the soil changes volume when wetted and dried. This is typical in soils with high clay content, such as the soils in Lancaster County. Shrink-swell causes negative impacts when not properly addressed. Shrinking and swelling of the soil can cause damage to foundations, service lines, sidewalks and roadways by heaving and cracking the concrete.

Utilizing GIS to understand where soils are susceptible to high productivity, high frost action, high shrink-swell potential, high salinity and hydric soils exist will assist the county to address the issues associated with each type of soil as development grows into new areas.

Environmental Imperatives and Planning Implications

Soils have an impact on both the built and natural environments. There is a relationship between how soils react to built structures and their suitability for different types of land uses. Soil-type can be a useful tool in determining where growth occurs.

The community may choose to consider permeability rates, erosion vulnerability, frost action, and shrink-swell potential as pertinent criteria for future development and integrate these issues into the planning processes.